



DC TELECOM ® SERIES SELF-CONTAINED, CLOSED LOOP

48 VOLT DC AIR CONDITIONER

DC8600T | DC11000T |DC17000T|DC22000T

INSTALLATION & OPERATION MANUAL

Raytheon Picture



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## How To Use This Manual

This manual is intended to be a guide to Sun Power Technologies line of vertical air conditioners. It contains installation, troubleshooting, maintenance, warranty, and application information. The information contained in this manual is to be used by the installer as a guide only. This manual does not supersede or circumvent any applicable national or local codes. If you are installing the DC Telecom Series unit, first read Chapter 1 and scan the entire manual before beginning the installation as described in Chapter 2. Chapter 1 contains general, descriptive information and provides an overview which can speed up the installation process and simplify troubleshooting.

If a malfunction occurs, follow this troubleshooting sequence:

1. Make sure you understand how the DC Telecom Series unit works (Chapters 1 & 3).
2. Identify and correct installation errors (Chapter 2).
3. Refer to the troubleshooting information in Chapter 4.

If you are still unable to correct the problem, contact the Factory at 317-399-8113 for additional assistance.

**Please read the following “Important Safety Precautions” before beginning any work.**

### Important Safety Precautions

1. USE CARE when LIFTING or TRANSPORTING equipment.
2. TRANSPORT the UNIT UPRIGHT. Laying it down on its side may cause oil to leave the compressor and breakage or damage to other components. If unit has been transported laying down, it must be positioned upright for at least 1 hour prior to unit being powered ON.
3. TURN ELECTRICAL POWER OFF AT THE breaker or fuse box BEFORE installing or working on the equipment. LINE VOLTAGES ARE HAZARDOUS or LETHAL.
4. OBSERVE and COMPLY with ALL applicable PLUMBING, ELECTRICAL, and BUILDING CODES and ordinances.
5. SERVICE may be performed ONLY by QUALIFIED and EXPERIENCED PERSONS.
  - Wear safety goggles when servicing the refrigeration circuit
  - Beware of hot surfaces on refrigerant circuit components
  - Beware of sharp edges on sheet metal components
  - Use care when recovering or adding refrigerant

### 6. Use COMMON SENSE - BE SAFETY-CONSCIOUS

This is the safety alert symbol . When you see this symbol on the DC Telecom ® unit and in the instruction manuals be alert to the potential for personal injury. Understand the signal word DANGER, WARNING and CAUTION. These words are used to identify levels of the seriousness of the hazard.

**DANGER** Failure to comply will result in death or severe personal injury and/or property damage.

**WARNING** Failure to comply could result in death or severe personal injury and/or property damage.

**CAUTION** Failure to comply could result in minor personal injury and/or property damage.

**IMPORTANT**

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Is used to point out helpful suggestions that will result in improved installation, reliability or operation

 **DANGER**

- **If the information in these instructions is not followed exactly, a fire may result causing property damage, personal injury or loss of life.**
- **Read all instructions carefully prior to beginning the installation. Do not begin installation if you do not understand any of the instructions.**
- **Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.**
- **Installation and service must be performed by a qualified installer or service agency in accordance with these instructions and in compliance with all codes and requirements of authorities having jurisdiction.**

**INSTALLER:** Affix the instructions on the inside of the building adjacent to the thermostat.

**END USER:** Retain these instructions for future reference.

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## **1.1 General Description**

Sun Power Technologies DC Telecom® series of vertical wall-mounted air conditioning systems provide high efficiency, DC powered cooling, and heating (optional) for electronic equipment shelters, process control centers, and other applications with high internal heat gains. The series includes multiple sizes and nominal cooling capacities from 8,600 to 22,000 BTUH.

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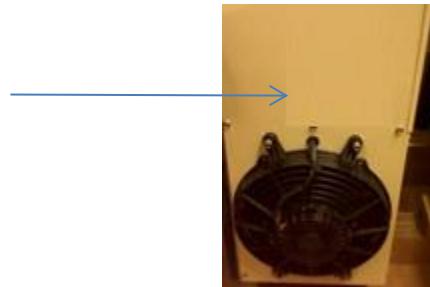
Sun Power Technologies DC Telecom® series air conditioners feature a proprietary DC compressor/controller combination that operates on true DC power. The systems have a smart control board that consolidates several of the electrical components, monitors battery state of charge and improves the air conditioner's reliability. The control board has an integrated blower relay, lockout relay, compressor time delay and the timed low pressure bypass. In addition, the control board has a high/low voltage protection circuit.

All DC Telecom® series models are designed for easy installation and service. Major components are accessible for service beneath external panels.

**ALL UNITS REQUIRE CIRCUIT PROTECTION AND VOLTAGE REGULATION.**

### 1.3 Serial Number Label

The Serial Number Label is located inside the enclosure.



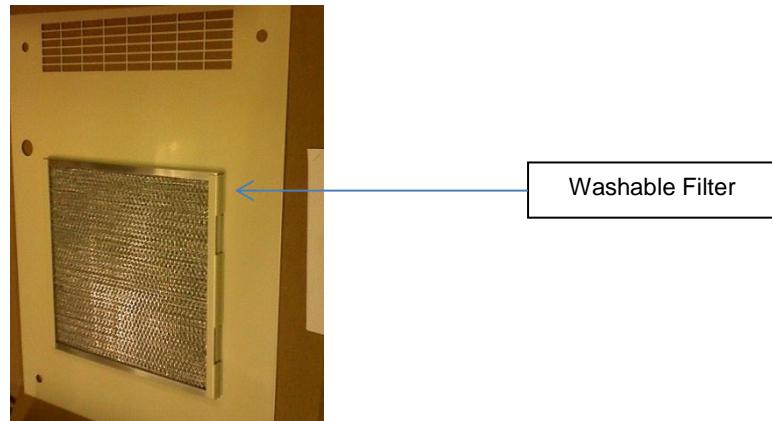
### 1.4 Air Flow and Filters

The DC TELECOM Series is equipped with a washable filter on the return air circuit. The system is designed to produce the following air flow using this filter. If alternative filter media is needed, please contact Sun Power Technologies to ensure adequate air flow can be maintained.

Condenser Fan	Evaporator Blower
360 CFM	580 (DC8600/11000/17000) 700 CFM (DC22000T)

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## 1.5 General Operation

The DC TELECOM system is designed to provide climate control for your enclosure. The system is controlled by setting the mechanical thermostat at the desired temperature. Once the desired temperature has been set, the DC TELECOM series air conditioner will cycle to maintain the temperature setting. The system thermostat detects the set point and calls for cooling to be turned on or off when the temperature reaches +/- 3 degrees F delta from set point.

The DC TELECOM Series system is equipped with a low voltage disconnect (LVD) to protect the battery source from over discharge. The LVD is designed to disconnect power from the air conditioner when voltage reaches 43 VDC and will automatically reset when input voltage reaches 51 VDC.

## 1.6 Electronic Control Board

The DC TELECOM series system has an integrated control board that manages power flow for the system. The control board has 3 low current outputs that can be used to send alarm signals for compressor failure, low power and pressure failure. Please refer to wiring diagram 4.4 for details.

## 1.7 Optional Controls

Sun Power Technologies offers the following control options:

- Optional Digital Thermostat
- Digital Lead Lag
- Pre-set Temperature set point

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## 1.8 Electrical Diagrams

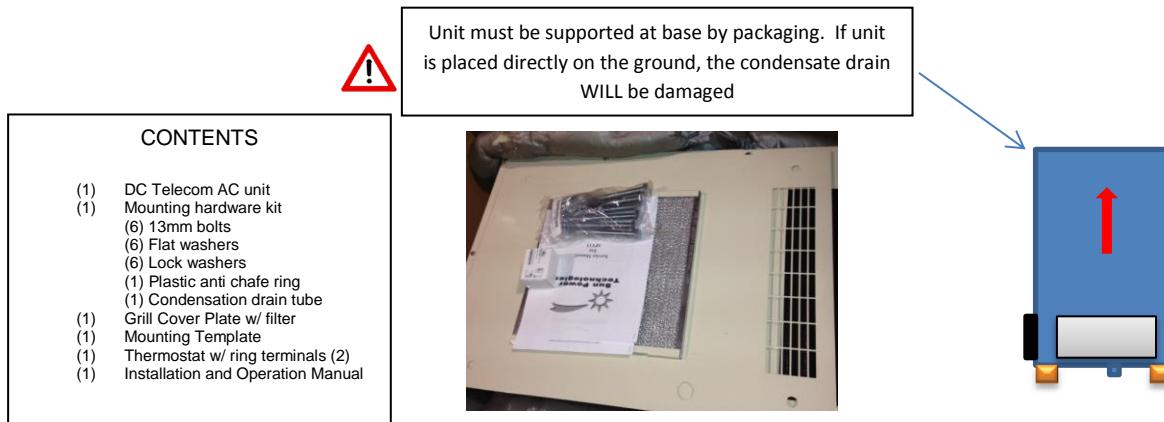
- Electronic Controls – See Service Manual
- Compressor Controller – See Service Manual
- Wiring to Unit – See Service Manual



## 2.0 Installation

### 2.1 Equipment Inspection

1. Open box that DC Telecom system is packaged in. Check all sheet metal and visible components for damage that may have occurred in transit. Please notify Sun Power Technologies immediately if damage is found.
2. Remove staples and/or tape from box and fold sides of box down.
3. Remove air conditioner from box and set upright



4. Open component box and locate installation template and mounting

**THERMOSTAT ADDENDUM - REPLACES PAGES 9 & 13**  
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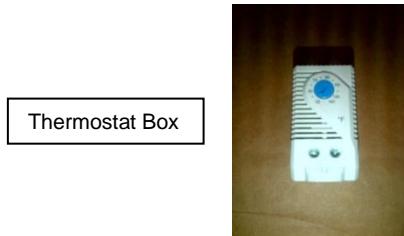
### Hardware

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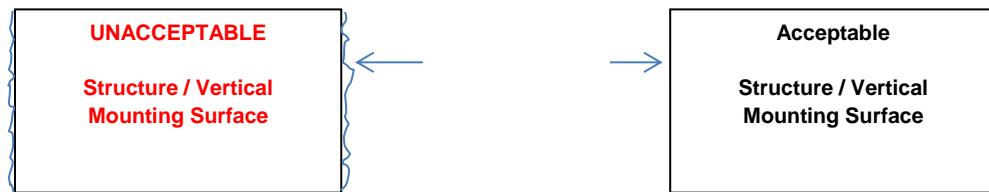
## 5. Locate Thermostat



## 2.2 Installation Requirement

## IMPORTANT

- Vertical Mounting Surface must be smooth and flat without significant texture in order for DC Telecom system to properly seal to structure
- Vertical Mounting Surface must be level to ensure proper drainage of condensation
- Structure must have a battery based 48 volt DC power source capable of managing a 40 Amp (DC8600/DC11000/DC17000) or 50 Amp (DC22000) load within 15' (3 meters) of mounting location
- Battery bank must be protected from high voltage spikes. The DC Telecom system has a pre-programmed shutdown mode if voltage exceeds 60 VDC for more than 5 seconds – **VOLTAGE OVER 60VDC WILL CAUSE BOARD DAMAGE OR FAILURE. OVER VOLTAGE FAILURES WILL NOT BE COVERED UNDER WARRANTY**
- Vertical Mounting Surface must be able to support 150 pounds (70 Kg)



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## 2.3 Installation Tools and Materials

### Tools

- Reciprocating Saw or any saw capable of cutting template holes in structure vertical mounting surface
- Power Drill
- ½" (13mm) Drill bit with adequate length to drill through vertical mounting surface
- ¾" (19mm) wrench or socket
- 5/16" (8mm) nut driver or socket
- Flat blade screwdriver
- Phillips head screwdriver
- Measuring device
- Bubble Level
- Thermometer

### Materials

- Adhesive Tape to secure template to vertical mounting surface
- Silicone sealant – 1 tube
- (2) ring terminals of appropriate size for 10 gauge power input cable to battery/power source

### Material Supplied

- (6) ½"x6" (13mm x 155mm) mounting bolts
- (6) flat washers
- (6) lock washers
- Weather stripping gasket – attached to system
- Anti-chafe ring for wiring harness
- Power input wiring – 15' (5 meters) red and black 10/8 gauge – attached to system
- Thermostat wiring – 15' (5 meters) attached to system
- Washable filter

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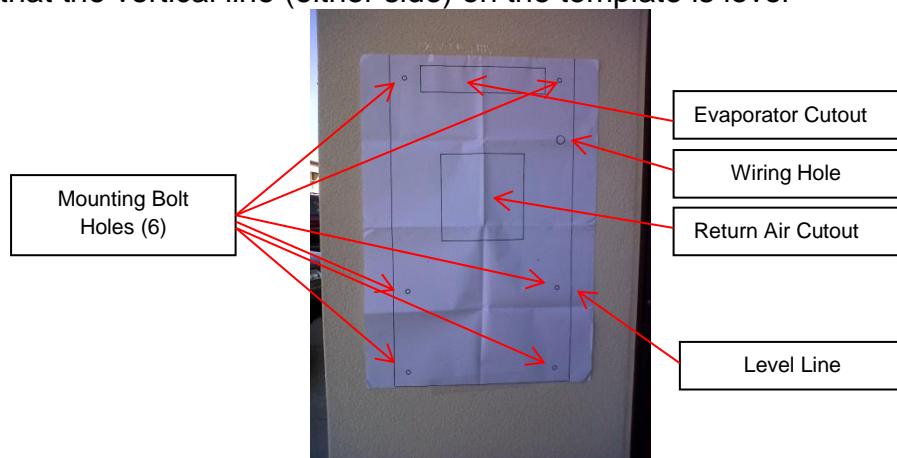
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## 2.4 Mounting the Unit

### IMPORTANT

1. Determine appropriate mounting location using DC Telecom template, ensuring that there are no electrical, plumbing or structural interferences in the cutout or drilling areas
2. Attach DC Telecom template to vertical mounting surface with tape making sure that the vertical line (either side) on the template is level



3. Mark centers of the mounting bolt holes and wiring holes onto the vertical mounting surface
4. Mark four corners of Evaporator cutout and four corners of Return air cutout onto the vertical mounting surface.
5. Once all holes and corner locations have been marked, remove the template.
6. Draw lines that connect the corner marks of the evaporator and return air cutouts
7. Drill 6 bolt holes, wiring hole and corner marks of the evaporator cutout and the return air cutout with  $\frac{3}{4}$ " (19mm) drill bit ensuring that the holes are perpendicular to the vertical mounting surface
8. Using reciprocating saw, cut the evaporator and return air cutout marks
9. Once all holes have been drilled and holes have been cut, test fit the DC Telecom unit to the vertical mounting surface – if adjustments need to be made do so now.
10. With one person outside and one person inside, person outside position the DC Telecom unit against the vertical mounting surface while taking care to route the wiring through the wiring hole – person inside attach bottom two  $\frac{1}{2}$ "

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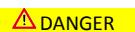
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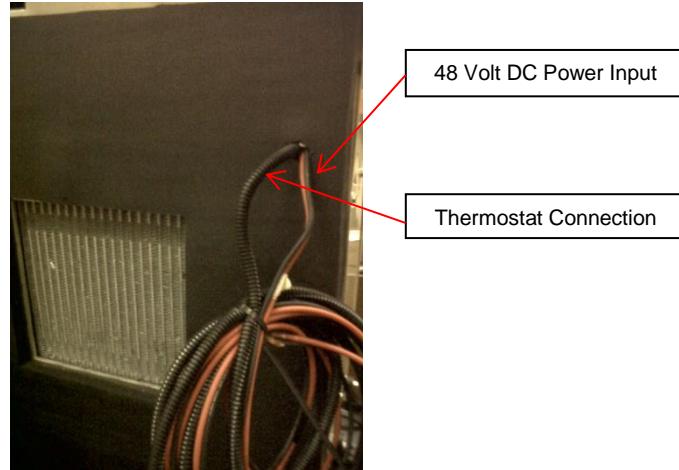
(13mm) bolts using flat and lock washers to secure the unit to the vertical mounting surface. Bolts should be hand tight.

11. Once unit is secure, attach the grill cover inside of the structure to the unit using 4- 1/2" (13mm) bolts, flat and lock washers. Bolts should be hand tight.
12. Once all bolts are installed and the wiring is pulled through the vertical mounting surface into the structure, bolts should be tightened to 40 foot/pounds – taking care to not over tighten the bolts.
13. Place plastic grommet around wiring and snap into grill cover wiring hole
14. Install filter element to grill cover

## 2.5 Electrical Connections



1. Locate the power input cables in the wiring harness. The wires are 10/8 gauge red and black copper strand 15' (5 meters) in length
2. Locate the thermostat connection cable in the harness. The thermostat input is wrapped in black wire loom.



### THERMOSTAT ADDENDUM - REPLACES PAGES 9 & 13

3. Attach wire harness to thermostat. Adjust length as needed.
4. Attach thermostat to electric junction box on interior wall away from direct sunlight and away from direct air flow from the DC Telecom unit

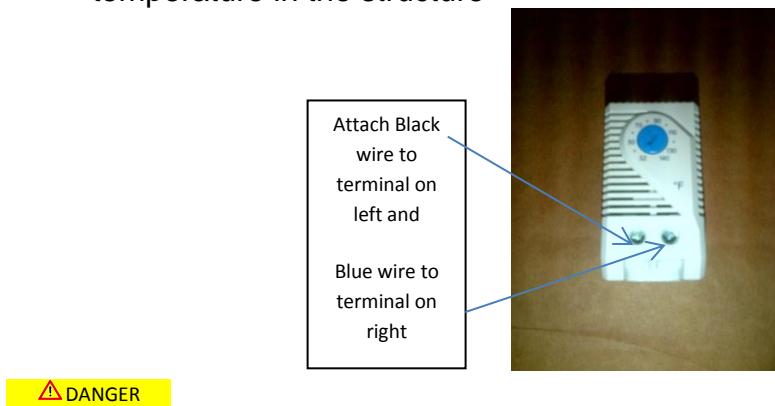
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5. Ensure that the set point on the thermostat is well above the ambient temperature in the structure



6. Route power cables to 48 volt DC battery power source or DC buss (+ or – OK). System MUST be connected to a 40 AMP (DC8600/11000/17000) OR 50 AMP (DC22000) circuit breaker or fuse. Please adhere to any local codes or restrictions when making electrical connections.
7. Once DC power has been connected, ensure that the supply voltage is 48 volts DC or greater. If the appropriate voltage is present, the system is ready to be powered on. If voltage is not present, batteries must be charge fully before the DC Telecom system is powered on.

### 3.0 Start Up

#### 3.1 Check out of Cooling Cycle

1. Turn Thermostat control to a set point lower than the ambient temperature Inside the structure.
2. The system will initialize, taking approximately 3 minutes for start-up.
3. Let the system run for approximately 15 minutes, then check the outlet temperature. The temperature should be approximately 20-30 degrees F delta cooler from the ambient inside the structure. If unit does not cool initially, see section 4 – Troubleshoot

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## 4.0 Troubleshooting

**See Attached Troubleshoot and Maintenance Manual**

## 5.0 Maintenance

### 5.1 Scheduled Maintenance

Sun Power Technologies strongly recommends that the air conditioner be serviced a minimum of twice a year – once prior to the heating season and once prior to the cooling season. At this time the filters, evaporator coil, condenser coil, the cabinet, and condensate drains should be serviced as described below. Also at this time, the air conditioner should be operated in the cooling and heating cycles as described in Chapter 3, Start-Up. In addition to this seasonal check-out, the DC Telecom System should be maintained as follows:

#### Air Filter

Replace / Clean the air filter whenever it is visibly dirty.

#### Evaporator

If the evaporator becomes clogged or dirty, it may be cleaned by careful vacuuming or with a commercial evaporator cleaning spray. DO NOT use a solvent containing bleach, acetone, or flammable substances. Turn off power before cleaning. Be careful not to wet any of the electrical components. Be sure the unit has dried before restarting.

#### Condenser

Periodically inspect the outdoor condenser coil and the cabinet air reliefs for dirt or obstructions. Remove foreign objects such as leaves, paper, etc. If the condenser coil is dirty, it may be washed off with a commercial solvent intended for this purpose. TURN OFF POWER BEFORE CLEANING! Be sure that all electrical components are thoroughly dry before restoring power.

#### Cabinet

The cabinet may be cleaned with a sponge and warm, soapy water or a mild detergent. Do not use bleach, abrasive chemicals or harmful solvents.

#### Drains

Regularly check the condensate drains. The drain has a stand pipe. An obstruction will force water to dump into the middle of the unit and drain out the

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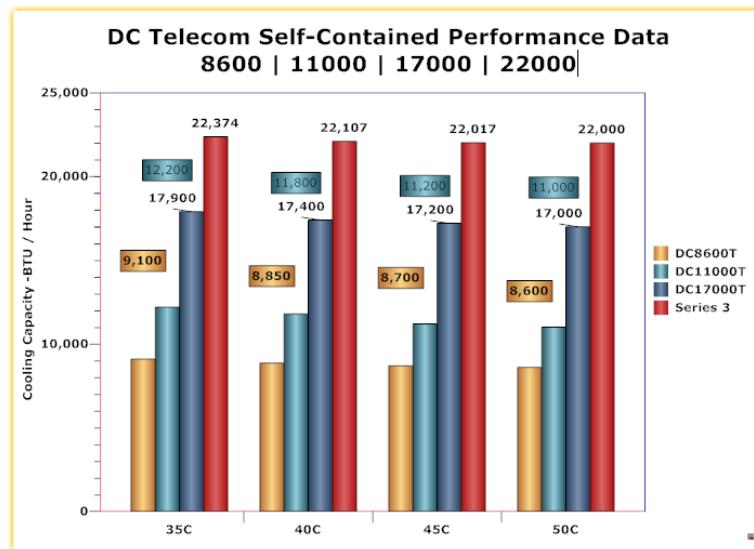
sides of the DC Telecom System, causing discoloration of the side panels. If discoloration is noted, service the drain. If a commercial drain solvent is used, flush out the drain pan and system with plenty of fresh water to prevent corrosion.

### **Lubrication**

Oiling of the condenser fan motor or the evaporator blower motor is not recommended.

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## 6.0 Performance Tables

### DC8600T - 48

Nominal Input Voltage	Duty Cycle %	Relative Humidity %	Ambient Air Temperature C	Power Consumption Watts
48 VDC	100	80	35	685
48 VDC	100	80	40	692
48 VDC	100	80	45	714
48 VDC	100	80	50	746
48 VDC	100	80	55	821

### DC11000T - 48

Nominal Input Voltage	Duty Cycle %	Relative Humidity %	Ambient Air Temperature C	Power Consumption Watts
48 VDC	100	80	35	819
48 VDC	100	80	40	836
48 VDC	100	80	45	844
48 VDC	100	80	50	878
48 VDC	100	80	55	966

### DC17000T - 48

Nominal Input Voltage	Duty Cycle %	Relative Humidity %	Ambient Air Temperature C	Power Consumption Watts
48 VDC	100	80	35	1270
48 VDC	100	80	40	1284
48 VDC	100	80	45	1305
48 VDC	100	80	50	1397
48 VDC	100	80	55	1437

### DC22000 - 48

Nominal Input Voltage	Duty Cycle %	Relative Humidity %	Ambient Air Temperature C	Power Consumption Watts
48 VDC	100	80	35	1930
48 VDC	100	80	40	1977
48 VDC	100	80	45	2000
48 VDC	100	80	50	2028
48 VDC	100	80	55	2080

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## 7.0 Warranty

### LIMITED WARRANTY

Sun Power Technologies, LLC (SPT) warrants its products to be free from defects in materials and workmanship for a 12 month period from the date of installation by end user or authorized distributor. SPT's obligation under this warranty is limited to repairing or replacing (at its sole option) any such defective products. To obtain service under this warranty you must obtain a Returned Material Authorization (RMA) number from SPT or an authorized SPT service center. Products must be returned to SPT or an authorized SPT service center with transportation prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. This warranty does not apply to equipment which has been damaged by accident, negligence or misapplication or has been altered or modified in any way, including opening of the unit's casing for any reason. This warranty applies only to the original purchaser who must have **PROPERLY REGISTERED** the product within 10 days of retail purchase or installation.

EXCEPT AS PROVIDED HEREIN, SUN POWER TECHNOLOGIES, LLC MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation (s) or exclusion (s) may not apply to the purchaser.

EXCEPT AS PROVIDED ABOVE, IN NO EVENT WILL SUN POWER TECHNOLOGIES, LLC BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS PRODUCT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. Specifically, SPT is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, cost of substitutes, claims by third parties, or otherwise.

Sun Power Technologies, LLC has a policy of continuous improvement. Specifications are subject to change without notice.

Products covered by this warranty\*\*:

DC Air Conditioners: DC3600, DC5000, DC1500T, DC6000/6000T DC8600/8600T, DC11000/11000T, DC17000/17000T, DC22000/ DC22000T, DC5000M, Hybrid Air Conditioners

### 7.1 Warranty Procedures and Forms

Included in packaging

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